

Case 3089

***Leucocytozoon* (Protista, Haemosporida): proposed adoption of Berestneff, 1904 as the author and of *Leukocytozoon danilewskyi* Ziemann, 1898 as the type species**

Gediminas Valkiūnas

Institute of Ecology, Akademijos 2, Vilnius 2600, Lithuania

Abstract. The purpose of this application is to resolve the uncertainty on the authorship of the haemosporidian parasite genus *Leucocytozoon* and the name of its type species. Many species of *Leucocytozoon* cause diseases in wild and domestic birds including hens, ducks, geese, turkeys and domesticated ostriches. Infection of birds with *Leucocytozoon* provides some of the best databases used by ecologists and evolutionary biologists. However, confusion arises from disagreement on the authorship of the nominal genus *Leucocytozoon* and on the name of its type species. To resolve this, it is proposed that the author of *Leucocytozoon* be confirmed as Berestneff (1904), with type species by monotypy *Leukocytozoon danilewskyi* Ziemann, 1898.

Keywords. Nomenclature; taxonomy; Protista; Haemosporida; blood parasites; *Leucocytozoon*; *Leucocytozoon danilewskyi*.

1. Ziemann (1898) published a detailed description of parasites recorded in the blood of three specimens of the little owl *Athene noctua* from Crema, Italy. This description was accompanied by excellent colour illustrations (pl. 3, figs. 29–33), which leave no doubt what species he was working with. Ziemann was uncertain that he had been working with a new species, and (p. 128) named the species only in the subtitle 'Das sogenannte Leukocytozoon Danilewskyi?'. This name is the first specific name of leucocytozoids for which the genus *Leucocytozoon* was subsequently established. The name 'Leukocytozoon' in Ziemann (1898) indicates in German the plural of a leucocytoid; it is not unambiguously available as a generic name, but for the purposes of this application it is here taken as an available name.

2. Neave (1939, p. 929) records the authorship of *Leucocytozoon* as 'Danilewsky, 1889, Parasitol. Sang, 23'. However, Danilewsky (1889, p. 23) did not use the word 'Leucocytozoon', nor did he establish a nominal genus similar to that word. He wrote 'Mais la forme et la dimension du noyau de la capsule, l'absence de grains de mélanine, la dimension et l'aspect de la membrane capsulaire tout ceci parle en faveur du développement de ces parasites intracellulaires dans les globules blancs du sang — ergo ce sont des Leucocytozoa (par analogie aux Hémicytozoa)'. Nor did Danilewsky use the word 'Leucocytozoon' in two related papers (Danilewsky, 1890, 1891). He used the terms Leucocytozoaires and Leucocytozoaire, as well as Leucocytozoa, in the plural to distinguish stages of parasites developing in leucocytes rather than in erythrocytes.

3. Berestneff (1904, p. 376) was the first person to make available the nominal genus *Leucocytozoon* without any attribution of authorship; *Leukocytozoen danilewskyi* Ziemann, 1898 is the type species by monotypy.

4. There has been long-standing uncertainty on the authorship of *Leucocytozoon* and the name of its type species. Authorship is sometimes attributed to Danilewsky (e.g. by Sambon, 1908, p. 245; Wenyon, 1926, p. 903; Neave, 1939, p. 929). Bennett, Garnham & Fallis (1965, p. 927) attributed *Leucocytozoon* to Ziemann (1898) with *L. danilewskyi* Ziemann, 1898 as type species. Bennett, Laird, Khan & Herman (1975, p. 24) reviewed the status of *Leucocytozoon* and attempted to 'clarify the confusion that has increasingly surrounded the genus *Leucocytozoon*'. They concluded that Berestneff (1904) 'failed to provide a formal designation or description of the genus *Leucocytozoon*' and that *L. danilewskyi* was a nomen nudum; they attributed authorship of *Leucocytozoon* to Sambon, 1908, with the type species *Leucocytozoon majoris* (Laveran, 1902). Bennett changed his mind and in 1982 (Bennett, Whiteway & Woodworth-Lynas) accepted *L. danilewskyi* as a valid name.

5. Garnham (1966) published the first illustrated review of the world fauna of haemosporidian parasites, and his monograph is frequently cited and is generally accepted as the most authoritative book on this subject. He analysed the literature and (p. 963) attributed authorship of *Leucocytozoon* to Berestneff (1904) with *Leucocytozoon danilewskyi* (Ziemann, 1898) as the type species. This attribution was followed by Hsu, Campbell & Levine (1973), by Fallis, Desser & Khan (1974) and more recently by Krylov (1994, 1996). In 1997 I published the first illustrated review of the world fauna of bird haemosporidian parasites since Garnham's (1966) monograph. With the concurrence of Dr I.M. Kerzhner (St Petersburg) with whom I discussed the problem, I followed Garnham's attribution of *Leucocytozoon* to Berestneff (1904) with *Leucocytozoon danilewskyi* (Ziemann, 1898) as the type species.

6. A number of recent authors have avoided the problem by omitting authorship of *Leucocytozoon*. However, I propose that the Commission should resolve the issue once and for all by ruling that the author of *Leucocytozoon* is Berestneff (1904) and that the type species is *Leukocytozoen danilewskyi* (Ziemann, 1898).

7. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary powers to suppress the name *Leukocytozoen* Ziemann, 1898, for the purposes of the Principle of Priority but not for those of the Principle of Homonymy;
- (2) to place on the Official List of Generic Names in Zoology the name *Leucocytozoon* Berestneff, 1904, type species by monotypy *Leukocytozoen danilewskyi* Ziemann, 1898;
- (3) to place on the Official List of Specific Names in Zoology the name *danilewskyi* Ziemann, 1898, as published in the binomen *Leukocytozoen danilewskyi* (specific name of the type species of *Leucocytozoon* Berestneff, 1904);
- (4) to place on the Official Index of Rejected and Invalid Generic Names in Zoology the name *Leukocytozoen* Ziemann, 1898, as suppressed in (1) above.

References

- Bennett, G.F., Garnham, P.C.C. & Fallis, A.M. 1965. On the status of the genera *Leucocytozoon* Ziemann, 1898 and *Haemoproteus* Kruse, 1890 (Haemosporidiida: Leucocytozoidae and Haemoproteidae). *Canadian Journal of Zoology*, **43**: 927-932.

- Bennett, G.F., Laird, M., Khan, R.A. & Herman, C.M. 1975. Remarks on the status of the genus *Leucocytozoon* Sambon, 1908. *Journal of Protozoology*, **22**: 24–30.
- Bennett, G.F., Whiteway, M. & Woodworth-Lynas, C.B. 1982. A host-parasite catalogue of the avian haematozoa. *Occasional Papers in Biology. Memorial University of Newfoundland*, **5**: 1–243.
- Berestneff, N. 1904. Über das *Leucocytozoon Danilewskyi*. *Archiv für Protistenkunde*, **3**: 376–386.
- Danilewsky, B. 1889. *La parasitologie comparée du sang*, part 1. *Nouvelles recherches sur les parasites du sang des oiseaux*. 93 pp., 3 pls. Darre, Kharkoff.
- Danilewsky, B. 1890. Développement des parasites malariques dans les leucocytes des oiseaux (*Leucocytozoaires*). *Annales de l'Institut Pasteur, Paris*, **4**: 427–431.
- Danilewsky, B. 1891. Ueber den *Polymitus malaria*. *Centralblatt für Bakteriologie und Parasitenkunde*, **9**: 397–403.
- Fallis, A.M., Desser, S.S. & Khan, R.A. 1974. On species of *Leucocytozoon*. *Advances in Parasitology*, **12**: 1–67.
- Garnham, P.C.C. 1966. *Malaria parasites and other Haemosporidia*. 1114 pp., 92 pls. Blackwell, Oxford.
- Hsu, C.-K., Campbell, G.R. & Levine, N.D. 1973. A check-list of the species of the genus *Leucocytozoon* (Apicomplexa, Plasmodiidae). *Journal of Protozoology*, **20**: 195–203.
- Krylov, M.V. 1994. *Agents of protozoan diseases of domestic animals and of man*. Vol 2, 269 pp. Zoological Institute Press, St Petersburg. [In Russian].
- Krylov, M.V. 1996. *Key to protozoan parasites of man, domestic animals and agricultural plants*. 603 pp. Zoological Institute Press, St Petersburg. [In Russian].
- Laveran, A. 1902. Sur une *Haemamoeba* d'une mésange (*Parus major*). *Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie, Paris*, **54**: 1121–1124.
- Neave, S.A. 1939. *Nomenclator Zoologicus*, vol. 2, D-L. 1025 pp. Zoological Society of London, London.
- Sambon, L.W. 1908. Remarks on the avian haemoprotozoa of the genus *Leucocytozoon*, Danilewsky. *Journal of Tropical Medicine and Hygiene*, **11**: 245–248.
- Valkiūnas, G. 1997. Bird Haemosporida. *Acta Zoologica Lituanica*, **3–5**: 1–607. [In Russian].
- Wenyon, C.M. 1926. *Protozoology: a manual for medical men, veterinarians and zoologists, etc.*, part 2. Baillière, Tindall & Cox, London.
- Ziemann, H. 1898. *Ueber Malaria- und andere Blutparasiten nebst Anhang. Eine wirksame Methode der Chromatin- und Blutfärbung*. 192 pp., 3 pls. Fischer, Jena.

Comments on this case are invited for publication (subject to editing) in the *Bulletin*; they should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD, U.K. (e-mail: iczn@nhm.ac.uk).